



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-Q3      BYPASS RATIO: 8.9  
 UNIQUE ID NUMBER: 02P23RR137      PRESSURE RATIO ( $\pi_{co}$ ): 48.0  
 COMBUSTOR: Phase5 Tiled  
 ENGINE TYPE: TF      RATED THRUST ( $F_{oo}$ ) (kN): 350.9

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
$D_p/F_{oo}$ (g/kN) or SN	0.0	8.2	74.0	16.4
AS % OF ORIGINAL LIMIT	0.0	6.9	54.4	97.7
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			68.0	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			71.9	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			78.0	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			86.0	

For non-volatile particulate matter (nvPM) emissions, please refer to the ICAO Engine nvPM Emissions Data Sheet.

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 - OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (% $F_{oo}$ )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	2.721	0.00	0.37	60.68	7.7
CLIMB OUT	85	2.2	2.217	0.00	0.43	44.92	10.4
APPROACH	30	4.0	0.719	0.00	0.55	14.68	9.8
IDLE	7	26.0	0.264	0.00	6.01	5.97	1.8
LTO TOTAL FUEL (kg) or EMISSIONS (g)			991	0	2737	25064	-
NUMBER OF ENGINES				8	8	8	8
NUMBER OF TESTS				18	18	18	18
AVERAGE $D_p/F_{oo}$ (g/kN) or AVERAGE SN (MAX)				0.0	7.8	71.4	14.7
SIGMA ( $D_p/F_{oo}$ in g/kN, or SN)				0.0	1.6	1.1	2.0
RANGE ( $D_p/F_{oo}$ in g/kN, or SN)				0.0	5.03-9.78	69.37-72.61	11.4-16.7

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS  
 STAGE BLEED 0 (% CORE FLOW) AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9-102.1
TEMPERATURE (K)	280.4-303.5
ABS HUMIDITY (kg/kg)	0.00308-0.01917

### FUEL

SPEC	
H/C	1.92
AROM (%)	16.89

MANUFACTURER: Rolls-Royce plc  
 TEST ORGANIZATION: Rolls-Royce plc  
 TEST LOCATION: Derby  
 TEST DATES: 24/09/2009-28/08/2019

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

1. Representative of Trent 1000-TEN engines
2. EDNS01000935986

Compliance with Fuel Venting requirements:

x ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)